

ELECTRONICS AND COMPUTER TECHNOLOGY

The Electronics and Computer Technology Department offers several concentrations in electronics and computer technology that are designed to prepare students for a variety of high-tech job/career opportunities in the fields of engineering and technology; electronics technology; computer technology; telecommunication technology; and related technologies.

Career Opportunities

Electronics Engineering Technologist, Computer Engineering Technologist, Network Engineering Technologist, Telecommunications Engineering Technologist, Certified Electronics Technician - CET, A+ Certified Computer Technician, N+ Certified Network Technician, Certified Telecommunication Technician, CISCO Certified Network Associate (CCNA), CISCO Certified Network Professional (CCNP), Microsoft Certified Professional (MCP), Microsoft Certified Systems Engineer (MCSE), Networking Cable Installer, Fiber Optics Installer, Microwave/Radar Technician, Laser/Optical Technician, Industrial Electronics Technician, Consumer Electronics Technician, Biomedical Instrument Technician, Audio/Visual Systems Technician, Broadcast Radio and Television, Research and Development, Sales Representative, electronics and computer equipment, Quality Control Technician,

Faculty

Rubayi, Khalid

Transfer

Most Electronics and Computer Technology courses transfer as electives or fulfill subject credit requirements. Students in this field sometimes choose to pursue a bachelor's degree in technology fields such as Industrial Technology at California State Polytechnic University, San Luis Obispo, or Engineering Technology at California State Polytechnic University, Pomona. Other students choose to pursue an Engineering degree which requires a more intense curriculum in mathematics, chemistry, and physics.

Campuses that offer Electronics and Computer Technology majors include: CSU - Chico, Fullerton, Long Beach, Pomona and Sacramento.

For the most up-to-date information on these programs and others, visit [assist.org](http://www.assist.org) (<http://www.assist.org>). Please stop by the Transfer Center in Building 23 or make an appointment with a counselor if you have questions.

Electronics and Computer Technology, AS

State Control Number: 07558

Program Code: ELCT.AS

Approved for Federal Financial Aid: Yes

The Electronics and Computer Technology major requires 18 units from any of the certificates or from any Electronics and Computer Technology coursework. ELCT 138 Work Experience Education Electronics may be used as elective credit, but may not be used to fulfill major requirements.

To earn this degree, complete the major coursework with "C" grades or better and all of the following graduation requirements: 60 minimum degree-applicable units (including a maximum 4 units of activity);

2.0 minimum overall GPA; 12 degree-applicable units through VVC; Information Competency; Global Citizenship; Kinesiology, and the VVC General Education pattern (<https://catalog.vvc.edu/degrees-certificates/vvcge/#vvcge>). Courses may count in one area only, either in the major or in a general education category. Courses counted in one AA/AS major may not be used in another AA/AS major.

Code	Title	Units
Required Courses		
Complete 18 units from the Electronics and Computer Technology (ELCT) discipline.		18.0
Select courses numbered 50-199, except 138.		
Total Units		18

Electronics Engineering Technology: Electronics, AS

State Control Number: 07557

Program Code: ELTCE.AS

Approved for Federal Financial Aid: Yes

To earn this degree, complete the major coursework with "C" grades or better and all of the following graduation requirements: 60 minimum degree-applicable units (including a maximum 4 units of activity); 2.0 minimum overall GPA; 12 degree-applicable units through VVC; Information Competency; Global Citizenship; Kinesiology, and the VVC General Education pattern (<https://catalog.vvc.edu/degrees-certificates/vvcge/#vvcge>). Courses may count in one area only, either in the major or in a general education category. Courses counted in one AA/AS major may not be used in another AA/AS major.

Code	Title	Units
Required Courses		
ELCT 50	A+ Operating Systems Technologies	4.0
ELCT 51		
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0

Electronics Emphasis

ELCT 53

ELCT 54

Mathematics Sequence

ELCT 57

ELCT 58

ELCT 59

ELCT 60

Students planning to transfer to an Electrical Engineering, BS program should take the following mathematics courses instead of Technical Mathematics and Calculus for Electronics.

MATH 104	Trigonometry
MATH 105	College Algebra
MATH 226	Analytic Geometry and Calculus I or MATH 226H Honors Analytic Geometry and Calculus I
MATH 227	Analytic Geometry and Calculus II

Code	Title	Units
	or MATH 22: Honors Analytic Geometry and Calculus II	
Total Units		28

Electronics Technician I Certificate of Achievement

State Control Number: 43177

Program Code: ELCT.ELTEI.CA

Approved for Federal Financial Aid: Pending (<https://catalog.vvc.edu/student-resources/financing-education/#Pending-FedAid>)

The following Electronics Certificate will satisfy industry standard requirements for entry level technicians servicing/working with electronic device such as; communication systems, avionics, control systems, robotics, mechatronics, microcontrollers and coding.

Code	Title	Units
Required Courses		
CIS 190	Introduction to the Unix Operating System	4.0
ELCT 71	Principles of Digital Logic and Circuits	4.0
ELCT 73	Microprocessor Principles	4.0
ELCT 131	DC Circuit Theory and Analysis	4.0
ELCT 132	AC Circuit Theory and Analysis	4.0
Total Units		20

Electronics Technician II Certificate of Achievement

State Control Number: 43176

Program Code: ELCT.ELTEII.CA

Approved for Federal Financial Aid: Pending (<https://catalog.vvc.edu/student-resources/financing-education/#Pending-FedAid>)

The following Electronics Certificate will provide prospective students with advanced expertise and hands-on experience working, troubleshooting and servicing complex electronic systems such as; telecommunication systems, avionics, control systems, robotics, mechatronics, and microcontroller based systems.

Code	Title	Units
Required Courses		
ELCT 76	Microprocessor Interfacing and Applications	4.0
ELCT 78A	Network Fundamentals	4.0
ELCT 133	Solid State Devices and Circuits	4.0
ELCT 134	Solid State Circuit Analysis	4.0
Total Units		16

Electronics and Computer Technology Courses

ELCT 7 A+ Certification Exam Preparation (2.0 Units)

This course is designed to prepare students for the Computing Technology Industry Association (CompTIA) A+ Certification Test. The course consists of a test-simulation-and-review software program that provides practice tests with realistic questions, a study guide, and reference materials. This course will not apply to the Associate Degree. Lab Hours: 72.0
Transfer: Not transferable

ELCT 50 A+ Operating Systems Technologies (4.0 Units)

Students will learn how to install, upgrade, and troubleshoot PC Operating Systems. The hands-on approach will enable students to install and configure different operating system such as Windows, Linux, and MAC OS. Students will learn how to use built-in tools to diagnose and troubleshoot problems with the operating system. Firewall configuration, user setup, roaming profiles, security, drive imaging, data backup, data recovery, printer sharing, and network troubleshooting. Students will learn how to use different tools to scan, diagnose and attempt to remove computer viruses, malware, ransomware, and other malicious software. Satisfies Cisco Certified Network Associates (CCNA) certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 61 Basic Maintenance of Personal Computers (4.0 Units)

This hands-on course is designed to train students with the skills necessary to build, service, upgrade and troubleshoot Personal Computers, PC Workstations, Laptops, Computer Networks and network peripherals such as printers. Students will learn how to use hardware diagnostic tools and software to troubleshoot PC Workstations and Network Hardware. Configure Network Printers, setup Wireless LANs, and Network Security. Network cable construction, testing and punch-down. Satisfies CompTIA A+ certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 71 Principles of Digital Logic and Circuits (4.0 Units)

This course will introduce students to digital logic circuits. Students will cover basic concepts in digital electronics, and discrete digital components. Hands-on LAB will cover steps to build, verify and troubleshoot digital circuits with emphasis on practical applications and proper use of test equipment. Topics include binary systems, logic gates, combinational logic, synchronous sequential logic, Flip-Flops, asynchronous sequential logic, registers, counters, memory, and digital integrated circuits.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 73 Microprocessor Principles (4.0 Units)

Introduction to the principles of microprocessor design, topics include microprocessor architecture, bus architecture, memory (R/W Memory, ROM, EPROM, and EEPROM) maps, interfacing devices, assembly language programming techniques, parallel I/O, serial I/O and interrupts. Laboratory projects include emphasis on designing and building microprocessor-based systems and hardware interfacing.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 76 Microprocessor Interfacing and Applications (4.0 Units)

Development of microprocessor based systems for embedded applications. Topics include Interfacing to input/output peripherals such as displays, keypads, sensors, digital-to-analog and analog-to-digital converters, and communication devices among others. Laboratory component is an integral part of this course emphasizing a hands-on approach for students to design, build, and test embedded micro-controller systems.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78A Network Fundamentals (4.0 Units)

The goal of this course is to introduce students to fundamental networking concepts and technologies. It will assist students in developing the skills necessary to plan and implement small networks across a range of applications. Topics include, OSI and TCP/IP models, different network topologies, IP addressing and sub-netting. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78B Routing Protocols and Concepts (4.0 Units)

This course will introduce students to routing concepts, and the operation of network routers. Students with hands-on approach will be able to configure, verify, and troubleshoot routing protocols such as RIPv2, RIPv6, EIGRP, OSPFv2, OSPFv3 and introduction to BGP. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78C LAN Switching and Wireless (4.0 Units)

This course provides a comprehensive and practical approach to learning the technologies and protocols needed to design and implement a converged switched network. Students will learn how to select network devices for each layer, how to configure access and multilayer switches to implement VLANs, VTP, and Inter-VLAN routing. Configure Layer 2 security on switches, setup Wireless LAN and configure WLAN security. Satisfies Cisco Certified Network Associate (CCNA) certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78D Accessing the WAN (4.0 Units)

This course will enable students in a hands-on approach how to implement and configure different WAN technologies. Students will configure different types of VPN configurations, configure security firewalls, NAT/PAT configuration on edge routers, setup DHCP and configure ACLs for controlling network traffic, also students will learn how to use software to monitor and analyze network traffic. Satisfies Cisco Certified Network Associates (CCNA) certification exam requirements.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78E Advanced Network Routing (4.0 Units)

This course is the first of a four course series designed to prepare students towards the Cisco Certified Network Professional (CCNP) Certification. It introduces students to advanced IP address management, scaling IP networks, IP addressing using VLSM, private addressing, and NAT to optimize address utilization. Majority of the course deals with advanced topics in configuring routing protocols (RIP v2, EIGRP, ISIS, multi-area OSPF, and BGP), also covers important topics and techniques for route filtering, route optimization and route redistribution.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78F Implementing Secure Converged Wide-Area Networks (4.0 Units)

This is the second course of a four course series designed to prepare students for Cisco Certified Network Professional (CCNP) certification. The course will cover advanced topics in Wide Area Network (WAN). Students learn with hands-on approach how to configure and implement different WAN technologies with focus on VPN configuration and securing network access. Topics include teleworker configuration and access, frame-mode MPLS, site-to-site IPSEC VPN, Cisco EZVPN, strategies used to mitigate network attacks, Cisco device hardening and IOS firewall features.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78G Bldg Multilayer Switched Networks (4.0 Units)

This is the third course of a four course series designed to prepare students for Cisco Certified Network Professional (CCNP) certification. The course will cover advanced topics in building Multilayer Switched Networks. Students learn with hands-on approach how to deploy state-of-the-art campus LANs. Topics include VLANs, Spanning Tree Protocol (STP), VTP, Inter-VLAN Routing, Layer three Switches, Wireless Client Access, Voice over IP (VoIP) Switch Configuration, Redundancy and Fault Tolerance.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78I Fundamentals of Network Security (4.0 Units)

The curriculum introduces the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network security appliances to maintain the integrity, confidentiality, and availability of data and devices. It provides students with both the technical knowledge and hands-on experience needed for the day-to-day, tactical knowledge and skills that Security Operations Center (SOC) teams need to detect and respond to cybersecurity threats. Students will gain knowledge and skills related to security concepts, security monitoring, hostbased analysis, network intrusion analysis, and security policies and procedures. Prep for Cisco CyberOps Associate Certification and CompTIA Security+

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 78K Voice Over IP (VoIP) Foundations (4.0 Units)

Practical hands-on approach to Voice over IP (VoIP) implementation. Topics include Internet Protocol carries a VoIP packet, configuring DHCP and DNS for supporting IP telephony, Real-Time Transport Protocol, Session Initiation Protocol, call set up, Instant Messaging, the H.323 protocol suite, gatekeepers, gateways, implementing QoS, jitter, latency, and packet loss impact to VoIP networks, troubleshooting RTP, MGCP, SIP, and H.323, and security considerations. Lab covers Cisco router, Switch, IP Phones, and CallManager Configuration.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Not transferable

ELCT 85 Fiber Optics (3.0 Units)

This hands-on self-paced course will provide students with the skills required to inspect, install and test fiber optic connectors, how to use the epoxy polish method, identify damage to cables and associated causes, test fiber optic cable for losses, fiber cable splicing, optical performance, install, configure, and troubleshoot fiber optic communications, switches and systems. Students will learn the principals of operation for an optical time domain reflectometer (OTDR) and how to use a light source/power meter.

Lab Hours: 108.0

Transfer: Not transferable

ELCT 87 Industrial Control Sys, Devices and Ckts (3.0 Units)

This course is designed to provide the student an opportunity to study a wide range of applications of electronics found in industrial automation and robotics. Topics include: operational amplifiers, linear integrated circuits, generators and motors, control devices and circuits, transducers, programmable logic controllers (PLCs), PLC functions, ladder logic, programming and applications.

Lab Hours: 108.0

Transfer: Not transferable

ELCT 110 Electronics and Computer Technology Fundamentals (3.0 Units)

This course is designed to introduce students to a wide range of topics in electronics and computer technologies. As an introduction course, it will demonstrate to students in a simplified and hands-on approach how modern electronics and computer technologies operate and are used in their daily lives. CSU

Lecture Hours: 54.0

Transfer: Transfers to CSU only

ELCT 131 DC Circuit Theory and Analysis (4.0 Units)

Introduction to DC circuits analysis, a theoretical and practical hands-on approach to DC fundamentals. Topics include Ohm's Law, Series, Parallel and Series-Parallel Circuits, Network Theorems, Methods of Analysis, Equivalent Circuits, Capacitive and Inductive Circuits, Timing Circuits, Measuring Instruments, Magnetism and Magnetic Circuits. A laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze DC circuits. CSU

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to both UC/CSU

ELCT 132 AC Circuit Theory and Analysis (4.0 Units)

Introduction to AC circuits analysis, a theoretical and practical hands-on approach to AC fundamentals. Topics include AC waveform analysis, Inductive and Capacitive Circuits, Impedance, Power in AC Circuits, AC Series-Parallel Circuits Design, Methods of AC Analysis, AC Network theorems, Resonance, and Filters. Lab component is an integral part of course, emphasizing hands-on approach using different test instruments and software applications to design, build, test, and analyze AC circuits. CSU/UC

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to both UC/CSU

ELCT 133 Solid State Devices and Circuits (4.0 Units)

Introduction to Solid State Devices; topics include Semiconductor Diodes, Bipolar Transistor Theory, DC Biasing of Bipolar Junction Transistors, Field-Effect Transistor Theory, FET Biasing, BJT and FET Small Signal Analysis, Large Signal Amplifiers, Introduction to Operational Amplifiers, Linear Integrated Circuit Regulators, Feedback Amplifiers and Oscillator Circuits. Laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze Solid State circuits. CSU

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 134 Solid State Circuit Analysis (4.0 Units)

Introduction to Operational Amplifiers and Linear Integrated Circuits, topics include Differential Amplifiers, Operational Amplifiers, Op-Amp with Negative Feedback, Frequency Response of an OP-Amp, Active Filters and Oscillators, Comparators, General Linear Applications, and Specialized Applications. Laboratory component is an integral part of this course emphasizing a hands-on approach for students to use different test instruments and software tools to design, build, test, and analyze various Op-Amps and Linear Integrated circuits. CSU

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 138 Work Experience Education Electronics (1-8 Units)

Work Experience Education is a key element of Victor Valley College's comprehensive approach to career development. Work Experience Education is a 16-, 12-, or 8-week course that enables students to receive college credit for paid or unpaid work opportunities. This course helps students gain valuable on-the-job work experience while providing practical education, best practices in professional development, and academic guidance through the course of their work opportunity. The combination of practical experience and curricular development empowers students to be more competitive, efficient and valuable employees upon completion of this program and/or their academic program trajectory. The course is ideal for students who are cross-training at their current worksite for upward mobility or seeking career changes, as well as those looking for entry-level occupational training through work-based learning experiences such as through an internship. Work Experience Education transforms community businesses, industries, and public agencies into expanded educational training laboratories. Credit is awarded on the basis of learning objectives completed and the number of hours the student trains. Students must create/complete new learning objectives each semester they enroll. Students may utilize their present work sites. More details are available in the Work Experience Education Office, (760) 245-4271, ext. 2281. The office, located in the Academic Commons, is open Monday-Thursday, 8:00 a.m.-1:00 p.m., 2:00-6:00 p.m., and by appointment. Please refer to the Work Experience Education section in this catalog for more information. CSU

Transfer: Transfers to CSU only

ELCT 201 Digital Logic Design Fundamentals (4.0 Units)

Binary systems and Boolean Algebra, Karnaugh Maps, Logic Gates, Combinational Logic, Synchronous Sequential Logic, Flip-Flops, Asynchronous Sequential Logic, Registers, Counters, Memory and Programmable Logic, Field Programmable Gate Array (FPGA), Introduction to Hardware Description Languages (HDL) using Verilog (VHDL), and digital integrated circuits.

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 202 Computer Methods for Engineers (4.0 Units)

This course is an introduction to methods and techniques for solving engineering problems using numerical-analysis computer-application programs, technical computing and visualization using MATLAB software. The course is structured to allow students to have a thorough hands-on experience with examples and exercises applied to a wide variety of practical engineering problems. CSU

Prerequisite(s): MATH 227 or MATH 227H, Minimum grade C

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 210 Engineering Circuit Analysis I (4.0 Units)

Introduction to engineering circuit analysis, topics include Ohm's Law, Series, Parallel and Series-Parallel Circuits, Network Theorems, Methods of Analysis, Mesh Equations, Equivalent Circuits, Capacitive and Inductive Circuits, First-Order Circuits, Timing Circuits, Measuring Instruments, Magnetism and Magnetic Circuits, Introduction to Electromagnetic radiation and Electric Machinery. Laboratory experiments and the use of Computer Aided Circuit Analysis software (MultiSim and MATLAB) is an integral part of the course to supplement classroom lectures. CSU

Prerequisite(s): MATH 226 or MATH 226H, Minimum grade C

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 211 Engineering Circuit Analysis II (4.0 Units)

Topics include analysis of RLC passive networks in response to single and multiple sinusoidal, ramp, and pulse sources, the Laplace Transform, and Fourier analysis. CSU

Prerequisite(s): ELCT 210, Minimum grade C

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

ELCT 212 Engineering Circuit Analysis Fundamentals (4.0 Units)

Topics include Ohm's Law, Network Theorems, Methods of Analysis, Mesh Equations, Superposition, Equivalent Circuits, First-Order and Second-Order RLC Circuits, Timing Circuits, Methods of AC analysis, Sinusoidal Steady-State Analysis, The Laplace Transform, Fourier analysis, Two-Port Networks, Resonance and Passive Filters. Nonlinear Circuit Analysis including Diodes. Laboratory experiments and the use of Computer Aided Circuit Analysis software such as (MultiSim and MATLAB) is an integral part of the course to supplement classroom lectures.

Prerequisite(s): PHYS 203, Minimum grade C

Lecture Hours: 54.0; Lab Hours: 54.0

Transfer: Transfers to CSU only

Program Learning Outcomes

Program Learning Outcomes (PLOs) are statements of the kind of learning a program hopes a student will achieve. The PLOs describe the knowledge, skills, problem-solving, communication and values that apply to all certificates and/or degrees within that program.

Upon completion of this program, students should be able to:

1. Demonstrate basic understanding of DC and AC circuit theory.
2. Demonstrate the ability to use DMM, Signal Generator, LCR meter, Power Supply and Oscilloscope to test and troubleshoot electronics equipment.
3. Demonstrate the ability to install, navigate and administrate Linux operating system Demonstrate the ability to test and troubleshoot digital electronics systems.
4. Demonstrate advanced knowledge in the operation of solid state devices and Analog/Digital Integrated Circuits.
5. Demonstrate the ability to use advanced techniques to troubleshoot using electronic testing equipment such as; DMM, Signal Generator, LCR meter, Power Supply and Oscilloscope to test and troubleshoot electronics equipment.
6. Demonstrate the ability to design, build and troubleshoot computer network systems.